Definition and Examples

Note 1
9080791fc8754b0bb88c381c10acbdfc

Let G be a group. If {{c2::H is a subgroup of G}} we shall write {{c1::

$$H \leq G.$$

}}

Note 2
66e7f23728af4c9d8839d172e59d716a

Let G be a group and $H \leq G$. We shall denote the operation for H by {{c1::the same symbol as the operation for G.}}

Note 3
e76ada2ee6da4b5fb71966e9f7ce3ded

Let G be a group. If {{c2::$H \leq G$ and $H \neq G$}} we shall write {{c1::$H < G$.}}

Note 4
1d28c11c52c84bd0b639505598bb1dce

If H is a subgroup of G then any equation in the subgroup H may also be viewed as {{c1::an equation in the group G.}}

Note 5
8f5b765961884460823141645b5ea08b

Let G be a group and $H \leq G$. What is the identity of H?

> The identity of G.

Note 6
7c122a5400f64eba9a76438c1ff296ee

Let G be a group and $H \leq G$. The identity of H is the identity of G. What is the key idea in the proof?

> The identity is unique and it is the identity of G.

Note 7
83cba804764b43e2baf282ffee513694

Let G be a group. What is the minimal subgroup of G?

> The singleton $\{1\}$.

Note 8

d40df9f46a6b43ecb3fea9b5b37e5b1c

Let G be a group. What is the element that any subgroup of G must contain?

> The identity of G.

Note 9

bc95ad6358814213a6fff2eb0cfd544b

Let G be a group and $H \leq G$. What is the inverse of an element x in H?

> The inverse of x in G.

Note 10

be9f1756cf3449e8a6718069fd4aedf5

Let G be a group and $H \leq G$. Why is the notation x^{-1} unambiguous?

> The inverse in H is the same as the inverse in G.

Note 11

8aabd93df8a5437eb3e50c3e0d438381

Let G be a group. {{c2::The subgroup $\{1\}$ of G}} is called {{c1::the trivial subgroup.}}

Note 12

eb859714e1f34f4db3dc35755f562945

Let G be a group. {{c2::The trivial subgroup}} is denoted by {{c1::1.}}

Note 13

74ab3ceb9a36420fb53dc2b3a22eb5f2

Which subgroups does any group have?

> The trivial subgroup and the group itself.

Note 14

5683ff4198a74e9d988f501c925d85ad

If H is a subgroup of G and K is a subgroup of H, then {{c1::K is a subgroup of G.}}

Note 15

50a07cbb14aa4bed8866efcbedb0be4d

Which object is considered in the Subgroup Criterion?

> Any subset of a group.

Note 16

840038893a3642a18c3e43c4e89aed17

What are the conditions of the Subgroup Criterion?

> The subset is nonempty and closed under $(x, y) \mapsto x \cdot y^{-1}$.

Note 17

71291d04ca2941fca2fc08759d8fd302

What is the special case considered in the Subgroup Criterion?

> The subset is finite.

Note 18

a1e69be09e78402d989b3805b3dfc54f

What are the conditions of the Subgroup Criterion for a finite subset?

> The subset is nonempty and closed under the operation.

Note 19

5bcd55a73e184bcd9bcc32f1ee47da2e

What is the key idea in the proof of the Subgroup Criterion for a finite subset?

> Any element's inverse is it's n-th power.